Research Report 1379

The Development of the Army Education Information System (AREIS)

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Instructional Technology Systems Technical Area
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U. S. Army

Research Institute for the Behavioral and Social Sciences

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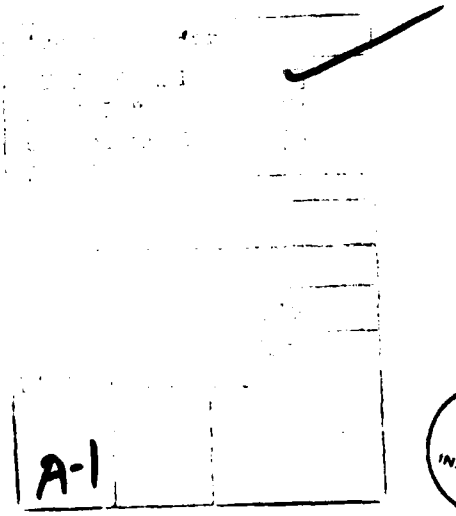

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This research report provides the background, conceptualization, and evaluation plan for the Army Education Information System (AREIS). AREIS is a computer-based educational and vocational guidance system designed to support counselors at Army Education Centers.

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Development of AREIS System

ARI Research Reports and Technical Reports are intended for sponsors of R&D tasks and for other research and military agencies. Any findings ready for implementation at the time of publication are presented in the last part of the Brief. Upon completion of a major phase of the task, formal recommendations for official action normally are conveyed to appropriate military agencies by briefing or Disposition Form.

FOREWORD

The Learning and Information Technology Systems Team of the U.S. Army Research Institute (ARI) performs research and development in educational technology with applicability to military education and training. Of special interest is the research in applications of computer technology. The development and implementation of computer-based systems is seen as a solution to current Army problems such as the management of career and educational information available to soldiers.

This report reviews the development of one such system--the Army Education Information System (AREIS)--and indicates a formative evaluation plan to assess its operation at Army Education Centers.

EDGAR M. JOHNSON
Technical Director

THE DEVELOPMENT OF THE ARMY EDUCATION INFORMATION SYSTEM (AREIS)

EXECUTIVE SUMMARY

Requirement:

To conceptualize, design, and test a computer-based system to support Army Education Center counselors by providing vocational and educational information about military and civilian occupations.

Procedure:

The Army Education Information System (AREIS) concept evolved from a needs assessment conducted at Army Education Centers worldwide. A prototype system was designed, and selected portions of AREIS were tested at Fort Sill, Oklahoma. The field tryout demonstrated user acceptance and the need for further implementation of microcomputer technology. The design of a microcomputer version of AREIS and system support documents have been completed. AREIS will be evaluated under operating conditions at three Army Education Centers. AREIS specifications will be finalized based on the evaluation results.

Utilization of Findings:

This effort will produce tested specifications for a microcomputer-based Army vocational and educational information center designed to support Army Education Center counselors. User manuals for counselors and soldiers and an in-service training package will also be provided.

THE DEVELOPMENT OF THE ARMY EDUCATION INFORMATION SYSTEM

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INTRODUCTION

One objective of the U.S. Army is to produce a combat-ready force through the development of personal skills and military proficiency. The Army Continuing Education System (ACES) supports this objective by providing educational opportunities to soldiers and enabling them to develop career goals that include military service and postservice education and training. Army Education Centers (AEC) have been established at every Army post having a minimum of 750 military members. These centers provide programs that are designed to (1) satisfy the skill development and occupational needs of the Army, (2) increase soldier potential, (3) enhance job satisfaction, and (4) increase personal educational growth. Specific academic offerings include the Basic Skills Education Program (BSEP), Advanced Skills Education Program (ASEP), high school completion program, and Servicemembers Opportunity Colleges Associate Degree (SOCAD) program. In skill development each AEC provides language, Military Occupational Specialty (MOS), and occupation-oriented courses. In the area of skill recognition, the Army Apprenticeship Program and Defense Activity for Non-Traditional Education Support (DANTES) certificate training are offered. Each AEC also provides educational services that include counseling, testing, and the support of a learning center.

The Adjutant General's Office (TAGO) supervises ACES and develops policy and guidance. Each installation/community commander conducts the ACES program through the Education Services Officer (ESO) who ensures that ACES educational and vocational opportunities are made available to all servicemembers. The ESO supervises the programs provided by contract instructors and Education Center counselors. The counselors are required to provide each servicemember with program information and counseling during initial training. Counseling also must be available to soldiers within 30 days of arrival at new duty stations, annually during the first enlistment, and 30 days prior to separation. The counseling emphasizes military professional development and educational benefits.

The primary sources of information about educational and vocational opportunities are the Education Center counselors. Two developments have hampered the provision of services by the Education Center staff: the increasing quantity and complexity of educational and vocational options, and the reduction in the number of Education Center counselors. Education Centers, increasingly understaffed for the increased workload, are experiencing difficulty in adequately serving their clients.

It has become evident that other means of supplying standardized, up-to-date, easily accessible educational and vocational information are needed. One such means is a computer-based information system. Over the past 2 decades, a growing number of guidance professionals have become increasingly committed to the use of the computer to assist with access and delivery of individualized educational and vocational information (Katz & Shatkin, 1980). This technological aid to the counseling process is worthwhile because of the computer's unique capability to store, search, retrieve, and update large masses of information; to relate educational and vocational data to information

about the user; to simulate an interactive dialogue; and to serve many users simultaneously with tailored information.

A computer-based career guidance system is intended to function in concert with, not instead of, the activities performed by guidance counselors. As the computer carries out information retrieving and dispensing functions and clerical duties, counselors should gain time to perform professional interviewing, group guidance, and consultation.

This research report will present the design and on-going development of a computer-based educational and vocational information system, which is one effort to overcome the increase in the amount of guidance information and the decrease in the number of counseling personnel in the Army.

BACKGROUND

Needs Assessment

In 1979 the U.S. Army Research Institute (ARI) initiated a research effort aimed at conceptualizing and developing a prototype computer-based system to provide information on military and civilian educational programs related to the Army career progression. This effort provided the design for the Army Education Information System (AREIS) which is based on the results of a Needs Assessment administered to Education Services Officers (ESOs) and Education Center counselors at Army posts worldwide (Harris-Bowlsbey & Rabush, 1979).

The Needs Assessment instruments were designed to collect data concerning (1) demographic information about the Education Center, (2) the variety and frequency of information requested by soldiers at the Education Center, and (3) ESO and counselor attitudes toward using computers. The instruments were distributed to all major commands. The return rate for the ESOs was 72% (131 of 182 questionnaires); the return rate for counselors was 64% (313 of 494 counselors responding).

The following summarizes the demographic data supplied by the ESOs. Of 144 posts responding, the permanent population ranged from 50 to 48,000 as noted in Table 1. ESOs reported the number of Education Center counselors on their staffs as ranging from 2 to 12 (see Table 2). Counselor/Soldier Ratios were reported by ESOs and counselors as indicated in Table 3. Data indicated that each counselor serves between 1,000 and 2,000 soldiers annually. The average workload is 1,600 soldiers per counselor per year.

Counselors indicated that half of their time is spent on one-to-one counseling of soldiers with the remainder distributed over administrative duties, orientation/outreach programs, clerical duties, liaison efforts, research and development, and other miscellaneous tasks. Counselors provide an average of two interviews per soldier per year, which represents approximately 64% of their workload. ESO and counselors ranked tuition assistance, college course offerings on or near post, and information about tests as ACES program information most frequently requested by soldiers. In descending order of frequency soldiers asked about orientation to the Education Center services, associate degree programs, college credit for military experience, and BSEP. In ranking requests for career planning information ESOs and

Table 1

Number of Soldiers on Post by Location

	TRADOC[a]	FORSCOM[b]	Other[c]	USAREUR[d]	Far East[e]
Minimum	300	400	200	50	200
Maximum	25,000	48,000	18,000	35,612	8,500

[a]Training and Doctrine Command.

[b]Forces Command.

[c]U.S. Army Materiel Development and Readiness Command, Military Traffic Management Command, U.S. Army Intelligence Command, U.S. Army Western Command, U.S. Health Services Command, U.S. Army Communication Command, and U.S. Army Military Academy.

[d]U.S. Army Europe and 7th Army.

[e]U.S. Army Japan/IX Corps, 8th Army-Korea.

Table 2

Mean Number of Counselors on Post by Location

TRADOC	CONUS FORSCOM	Other	USAREUR	Far East
5.5	11.5	3.3	4.0	2.2

Table 3

Mean Counselor/Soldier Ratio by Location

	TRADOC	CONUS FORSCOM	Other	USAREUR	Far East
ESO-reported	1,835	1,564	992	1,359	1,216
Counselor-reported	1,567	1,952	1,209	1,458	2,019

counselors indicated the following in descending order of frequency: developing a personal career plan in and beyond the military, assessing interests, and making the transition from a military to a civilian job.

ESOs and counselors also responded to a series of questions aimed at determining their attitudes about utilizing computers to deliver ACES information. Counselors indicated that computerization of information about new and existing ACES programs, Department of the Army regulations, master schedules of courses, and MOS and civilian occupations would be useful. ESOs and counselors agreed that a computerized system would provide soldiers with consistent information and would most likely be used frequently by soldiers. Counselors would welcome this type of system because it would enable them to counsel more soldiers while reducing their administrative workload. Counselors also indicated a need for training on the use of a computerized system. In general ESOs and counselors were positive about the value of this type of system as a tool to support Education Center operations.

AREIS Concept

The Needs Assessment results provided the rationale for the AREIS concept, which is a computer-based guidance system designed specifically for Education Center use. AREIS is composed of four courseware subsystems. Three of these serve the soldier directly by providing information concerning soldier-selected counseling issues. The fourth subsystem stores soldier records and is accessible only by counselors and Education Center staff.

Subsystem I, ORIENTATION, is the entry point for the soldier. The objectives of ORIENTATION are to (1) familiarize the user with the computer terminal and printer, (2) provide instruction about the content of the AREIS, (3) explain the Education Center services, and (4) provide an overview of all ACES programs. The Education Center services described in this subsystem include educational counseling and improvement, skill development and recognition, and support services. Brief descriptions of 16 ACES programs including apprenticeship, high school completion, and tuition assistance are available on a menu for selection by the soldier.

The second subsystem, SELF-INFORMATION, is designed to help the soldier define his or her work-related interests, aptitudes, and values. The soldier may select from three on-line assessment instruments that are scored by the computer, based on the soldier's selection of educational level. A list of occupations is generated by the soldier's responses to the UNIACT Interest Inventory designed by the American College Testing Program (1978). The values instrument enables the soldier to examine his or her work-related values and produces a list of appropriate occupations. The computer generates a summary that consolidates all elements of self-information provided by the soldier.

Subsystem III, GOALS AND PLANNING, helps the soldier identify educational and vocational short- and long-range goals. It also provides details of ACES programs that can help the soldier achieve these goals. The soldier can select from preprogramed short-range goals that can be attained while serving in the Army; these include Improving Basic Skills, Getting Promoted, and Improving MOS Skills. The soldier may also select from a menu of

long-range goals that can be achieved during or after the Army career; these include Making a Vocational Choice, Completing the Next Step in Education, and Planning a Military Career.

Subsystem IV, COUNSELOR-ADMINISTRATOR, has been designed to provide counselors with current educational and vocational information to be used during counseling interviews. This subsystem, which is maintained locally at each Education Center, contains a master schedule of all courses on or near post and contains an occupational data file of 420 civilian occupations and an MOS data file that indicates correspondence of MOS to civilian occupations. Soldier records are also maintained in Subsystem IV, which provides a record of each soldier's SELF-INFORMATION assessment and GOALS AND PLANNING activities. It should be noted that this subsystem is accessible only by Education Center staff who have appropriate passwords; thus the security of the soldiers' records is maintained.

Field Tryout

A field tryout of segments of the four AREIS subsystems was conducted at the Fort Sill, Okla., Education Center in April 1980. The following segments were tested:

1. Subsystem I, ORIENTATION: an overview of AREIS, Education Center Services, and ACES programs.

2. Subsystem II, SELF-INFORMATION: on-line administration of the UNIACT Interest Inventory.

3. Subsystem III, GOALS AND PLANNING: the goal entitled "To Complete the Next Step in Education," designed to provide information about educational offerings on or near post.

4. Subsystem IV, COUNSELOR-ADMINISTRATOR: a demonstration of the administrative files that can be maintained by AREIS, including a master schedule of courses and soldier summary report data.

The segments were programed in PLANIT (Programing Language for Interactive Teaching) on the Army's UNIVAC 1108 computer at the Edgewood Arsenal, Md., and delivered to Fort Sill in a time-sharing mode.

Twelve counselors and 64 soldiers participated in the field tryout. The soldiers were volunteers who had come into the Education Center for ACES information. On-line surveys were given to the soldiers prior to using AREIS and after the use of each subsystem to determine their attitudes on the usefulness, clarity, and interest level of all segments. Soldiers perceived the computer and AREIS content as useful for educational and vocational planning. Counselors indicated that the information provided by the AREIS subsystems was useful and accurate and responded favorably to the computerized delivery of educational information to soldiers.

Also of interest at the field tryout was the operation of the software and hardware. Some limitations of PLANIT were identified, including the inability to search data files, clear the terminal's screen completely, and

remain in contact with the mainframe after a 5-minute delay between users. A cost/benefit analysis was performed to examine alternate delivery systems for AREIS. The hardware configurations compared were a maxicomputer (such as that used during the field tryout), a distributed network of minicomputers, and a stand-alone microcomputer. The microcomputer was selected for future AREIS development and field testing because it has the maximum cost feasibility, requires a minimum of technical and clerical support, is easily operated by non-technical personnel, and can be readily installed overseas.

Completion of AREIS Development

The results of the field tryout have guided the completion of the four AREIS subsystems. An in-service training package has been prepared to train counselors and other Education Center personnel in the operation of AREIS, and user manuals have also been written for soldiers and counselors to guide their interactions with the computer.

AREIS software, programed in PASCAL, has been prepared for use on two multi-user microcomputers--the APPLE and the DISCOVERY computers. The APPLE configuration consists of three APPLE II computers with 48K RAM, monitors, a Corvus 10MB Winchester disc, a 5 1/4-inch floppy disc drive, a multiplexer, and a printer. The APPLE microcomputer was selected for the field test because FORSCOM posts are acquiring APPLEs. The DISCOVERY system was selected to test out a second microcomputer system. It consists of a DISCOVERY Basic System (each user has its own 4MHZ Z-80 CPU, 64K RAM, and shares a mass-storage device of 128 MB), monitors, keyboards, and a printer.

Evaluation

A formative evaluation of the total microcomputer version of AREIS will be conducted for 9 months in Education Centers at Fort Gordon, Ga.; Fort Meade, Md.; and Mannheim, West Germany. The following questions will be answered during this field test:

1. Do the AREIS courseware and software operate as conceptualized?

2. Is the multi-user microcomputer configuration appropriate for Education Center needs?

3. What are the reactions of soldiers, counselors, and Education Service Officers to AREIS and to the use of a computer for dispensing career and educational information?

4. What impact does AREIS have on Education Center operations?

The above information will be collected by several means. Each field test site will be managed by a local team leader who will be responsible for recording any problems with AREIS courseware, software, and hardware. Counselors will maintain a log of interviews with soldiers; this log will indicate the educational activities of soldiers who use AREIS and those who do not; the interview time with AREIS users and those who do not use AREIS; and the number of soldiers who are invited to use AREIS and decline; and the reasons

they decline. Several questionnaires will be administered by the computer to assess soldier and counselor reactions to the system. These questionnaires can be examined in Appendixes A, B, and C. These data will be summarized and evaluated by appropriate statistical procedures.

SUMMARY

ARI is guiding the development and field test of AREIS as one solution to the surge of information that must be provided by a decreasing number of Education Center counselors. The product of the field test will be a tested set of specifications for a microcomputer-based counseling support system designed to meet Army Education Center information needs. The potential payoff of AREIS may be observed in increased soldier potential, job satisfaction, and educational growth while supporting the occupational needs of the Army.

REFERENCES

Harris-Bowlsbey, J. & Rabush, C. (1979). A needs assessment for the Army Education Information System (Research Note 83-17). Alexandria, VA: US Army Research Institute.

Katz, M. R., & Shatkin, L. (1980). Computer-assisted guidance: Concepts and practices (ETS Research Report 80-1). Princeton, NJ: Education Testing Service.

APPENDIX A

PRE-AREIS QUESTIONNAIRE (SOLDIER)

1. Enter Social Security number.

2. Enter name.

3. Enter sex.

4. Enter rank.

   E1
   E2
   E3
   E4
   E5
   E6
   E7
   E8
   E9
   Warrant Officer
   Officer
   Other

5. Enter time in service (in years).

6. Enter time in grade (in years).

7. Enter time at this post (in months).

8. At this point, I have:

   a. No idea about my future vocational plans.
   b. Some vague ideas about my future vocational plans.
   c. Narrowed future plans to two or three choices.
   d. Narrowed future plans to one certain vocation.

9. At this point, I have:

   a. No idea about my educational plans.
   b. Some vague ideas about my educational plans.
   c. Narrowed my educational plans to one or two possible types of training.
   d. Selected one program for more education or training.

10. For help with my job and educational planning, I think a computer would be:

    a. Very useful.
    b. Useful.
    c. Undecided.
    d. Not very useful.
    e. Not at all useful.

APPENDIX B

POST-AREIS QUESTIONNAIRE (SOLDIER)

1. How useful was your use of AREIS?

   a. Very useful.
   b. Quite useful.
   c. Moderately useful.
   d. Somewhat useful.
   e. Not useful at all.

2. How enjoyable was your use of AREIS?

   a. Very enjoyable.
   b. Quite enjoyable.
   c. Moderately enjoyable.
   d. Somewhat enjoyable.
   e. Not enjoyable at all.

3. Which part of AREIS was the most useful to you?

   a. Orientation (Part I).
   b. Self-Information (Part II).
   c. Goals & Planning (Part III).

4. Which part of AREIS was the most interesting to you?

   a. Orientation (Part I).
   b. Self-Information (Part II).
   c. Goals & Planning (Part III).

5. What about the words used in AREIS?

   a. I could understand everything.
   b. I didn't understand some words or sentences.
   c. I didn't understand a lot of it.

6. Did you have any of these problems?

   a. Trouble with the computer.
   b. Directions for using computer were not clear.
   c. Directions for using AREIS were not clear.
   d. It was boring.

7. Would you recommend AREIS to a friend?

   a. Yes.
   b. No.

8. What have you done since you last used AREIS?*

   a. Talked to a counselor.
   b. Talked to my unit officer, sergeant, or milpo staff member.
   c. Read more information about a job.
   d. Signed up for a course.
   e. None of the above.

   You may choose one or any combination of options (e.g., a, b, c, d).

9. At this point, I have:

   a. No idea about my future vocational plans.
   b. Some vague ideas about my future vocational plans.
   c. Narrowed future plans to two or three choices.
   d. Narrowed future plans to one certain vocation.

10. At this point, I have:

   a. No idea about my educational plans.
   b. Some vague ideas about my educational plans.
   c. Narrowed my educational plans to one or two possible types of training.
   d. Selected one program for more education or training.

11. For help with my job and educational planning, a computer was:

   a. Very useful.
   b. Useful.
   c. Undecided.
   d. Not very useful.
   e. Not at all useful.

12. For help with my vocational planning, a computer was:

   a. Very useful.
   b. Useful.
   c. Undecided.
   d. Not very useful.
   e. Not at all useful.

*The computer will be programed to insert this question on visits two through "n" use only.

APPENDIX C

POST-AREIS QUESTIONNAIRE (COUNSELOR)

Please answer the following questions as honestly as possible. The information you provide will be confidential. Most responses will be used in the aggregate. Individual comments may be used within the Field Trial Report; they will be used for research purposes only and will not be associated with individual ESOs or counselors.

The following questions relate to the Soldier Subsystems:

1. Is the information in the Soldier Subsystems accurate?

    a. Very accurate.
    b. Moderately accurate.
    c. Undecided.
    d. Somewhat inaccurate.
    e. Very inaccurate.

2. To what extent is the information in the Soldier Subsystem appropriate?

    a. Very appropriate.
    b. Moderately appropriate.
    c. Undecided.
    d. Somewhat inappropriate.
    e. Very inappropriate.

3. In general, is the style of presentation in the Soldier Subsystem appropriate for soldiers on your post?

    a. Very appropriate.
    b. Moderately appropriate.
    c. Undecided.
    d. Somewhat inappropriate.
    e. Very inappropriate.

4. The information in AREIS:

    a. Told soldiers everything they wanted to know.
    b. Told soldiers most of what they wanted to know.
    c. Was inadequate.
    d. Told soldiers more than they wanted to know.
    e. I don't know.

5. In using AREIS, soldiers:

    a. Had no difficulty with words or ideas.
    b. Had no difficulty with words, but some difficulty with ideas.
    c. Had no difficulty with ideas, but some difficulty with words.
    d. Had difficulty with both words and ideas.
    e. I don't know.

6. The best thing about AREIS was (more than one answer):

   a. The machine was fun to work with.
   b. It helped soldiers relate information about themselves to military and civilian career options.
   c. It helped soldiers obtain information about military and civilian educational options.
   d. It gave soldiers a lot of information.
   e. It was objective and consistent.
   f. All of the above.

7. The worst thing about AREIS was (more than one answer):

   a. The machine was broken too much.
   b. There wasn't enough information that soldiers wanted to know.
   c. There was too much content; it took too long for soldiers to go through; it was confusing.
   d. Working with a machine was too impersonal.
   e. All of the above.

8. The most helpful parts of AREIS were (select as many as you wish):

   a. Part One: Orientation.
   b. Part Two: Interests.
   c. Part Two: Abilities.
   d. Part Two: Values.
   e. Part Three: Getting Promoted.
   f. Part Three: Developing Some New Interests.
   g. Part Three: Getting Some Job Skills.
   h. Part Three: Completing a Next Step in Education.
   i. Part Three: Planning a Military Career.
   j. Part Three: Improving MOS Skills.
   k. Part Three: Selecting Another MOS.
   l. Part Three: Improving Basic Skills.
   m. Part Three: Deciding about Reenlistment.
   n. Part Three: Making a Vocational Choice.

9. The least helpful parts of AREIS were (select as many as you wish):

   a. Part One: Orientation.
   b. Part Two: Interests.
   c. Part Two: Abilities.
   d. Part Two: Values.
   e. Part Three: Getting Promoted.
   f. Part Three: Developing Some New Interests.
   g. Part Three: Getting Some Job Skills.
   h. Part Three: Completing a New Step in Education.
   i. Part Three: Planning a Military Career.
   j. Part Three: Improving MOS Skills.
   k. Part Three: Selecting Another MOS.
   l. Part Three: Improving Basic Skills.
   m. Part Three: Deciding About Reenlistment.
   n. Part Three: Making a Vocational Choice.

10. What is your general reaction to providing information to soldiers by computer?

    a. Positive.
    b. Neutral.
    c. Negative.

The following questions relate to the Counselor Subsystem:

11. How accurate is the information in the Counselor Subsystem?

    a. Very accurate.
    b. Moderately accurate.
    c. Undecided.
    d. Somewhat inaccurate.
    e. Very inaccurate.

12. To what extent is the information in the Counselor Subsystem displayed in an appropriate format?

    a. Very appropriate.
    b. Moderately appropriate.
    c. Undecided.
    d. Somewhat inaccurate.
    e. Very inaccurate.

13. How useful is the information in the Counselor Subsystem?

    a. Very useful.
    b. Moderately useful.
    c. Undecided.
    d. Not very useful.
    e. Not useful at all.

The following questions will be asked during a structured interview.

14. How is the content of your interviews with soldiers who have used AREIS different from that with soldiers who have not used AREIS?

15. How has your role of counselor changed since AREIS has been in the Education Center?

16. What kind of feedback have you received from soldiers about their AREIS experience?

17. What changes would you suggest for the AREIS Soldier System?

18. What changes would you suggest for the AREIS Counselor System?